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Air/Superfund National Technical Guidance Series Sluperfund Air Pathway Analyses Review Criteria Checklists

(U.S.) Radian Corp., Austin, TX

Prepared for:

Environmental Protection Agency, Research Triangle Park, NC

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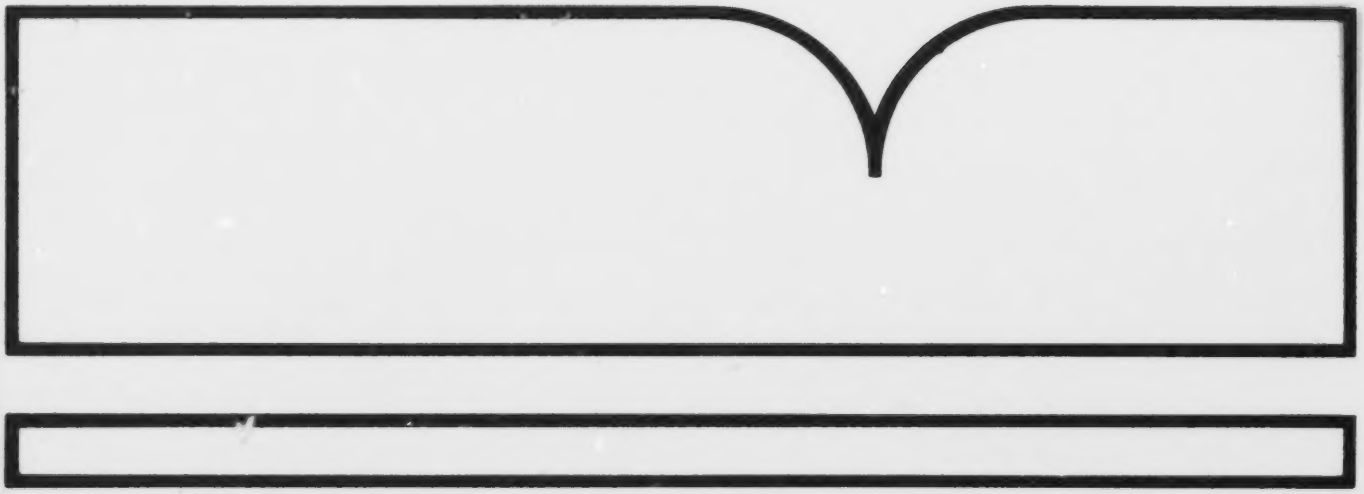

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16. ABSTRACT

The EPA has responsibility for assessment and cleanup of superfund sites. Because air emissions pose a potential human health risk at these sites, the EPA has developed a set of procedures for evaluating these risks. The four checklists presented in this report provide a systematic approach for air reviewers to apply the air pathway assessment procedures. The background, prupose, and application of the checklists are discussed.

17. KEY WORDS AND DOCUMENT ANALYSIS

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SUPERFUND AIR PATHWAY ANALYSES

REVIEW CRITERIA CHECKLISTS

FINAL REPORT

by

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Contract No. 68-02-4392
Work Assignment No. 61

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B. Review Criteria Checklist for the Remedial Investigation Phase of the Superfund Remediation Process

C. Review Criteria Checklist for the Feasibility Study Phase of the Superfund Remediation Process

D. Review Criteria Checklist for the Remedial Design Phase of the Superfund Remediation Process

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SECTION 1

INTRODUCTION

This report documents the development of checklists for the review of Superfund Air Pathway Analyses (APAs). Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the recent Superfund Amendments and Reauthorization Act (SARA), EPA has the responsibility for assessment and cleanup of Superfund sites. Because air emissions pose a potential human health risk at these sites, the EPA developed a four-volume set of procedures for evaluating these risks entitled Procedures for Conducting Air Pathway Analyses for Superfund Applications (hereafter referred to as the NTGS volumes).

The task of ensuring that all aspects of determining the effects of airborne pollutants from hazardous waste sites is very complex and therefore a systematic approach is necessary. The Checklists presented here are designed to assist reviewers of EPA documents in systematically applying the procedures. The checklists contain questions on all important aspects of the APA process to ensure that all significant risks are evaluated.

Four separate checklists were drafted sequentially and revised according to EPA comments. Each checklist coincides with one of the major deliverables of the Superfund Remedial Action process. Air pathway assessment techniques were applied to the Superfund remedial action process to develop the set of questions which make up each checklist. Information for the content of the checklists was drawn from Superfund documents, the NTGS series, other checklists, and Radian's experience in the field.

This report presents Radian's work under EPA Contract 68-02-4392, Work Assignment 61. The report discusses the background, summarizes related documents, discusses the use of the checklists, summarizes the contents of

each checklist and provides the final versions of the checklists in the appendix. A reproducible master set of checklists is provided separately.

SECTION 2

BACKGROUND

Although the methods of air pathway analyses of environmental air pollutants are reasonably well understood, the application of these methods to hazardous waste sites is fairly new. In addition the problems of estimating the emissions from the hazardous waste sites are complex because the source contamination level is rarely known with great precision. The APA problems encountered at hazardous waste cleanup sites require techniques specifically designed for hazardous waste sites. The NTGS volumes were therefore completed in 1989 to provide the required techniques.

The NTGS volumes contain four volumes of detailed procedures for the following:

- An overview and general APA procedures;
- Emission estimates from uncontrolled Superfund sites with an emphasis on landfills and lagoons;
- Emission estimates from remedial activities such as material moving and sources such as incinerators and strippers; and
- Dispersion modeling and air monitoring methods.

Technical resources are provided for the design of measurement programs, dispersion estimates, emission controls, and impact assessments. The series is designed to be used by EPA remedial project managers, enforcement project managers, air experts, and contractors involved in Superfund remediation activities.

SECTION 3

PURPOSE AND USE OF THE CHECKLISTS

The checklists are intended for use by EPA air reviewers when they are performing the tasks of reviewing the APAs submitted with Superfund remedial action documents. The format of the APAs has been known to vary significantly from one project to the next. The organization and presentation of information dealing with air pathway analyses can vary. In some cases, the reviewer must review large volumes of data to find the required information. In consideration of the above variations and difficulties, the checklists are designed to organize the process of review and to ensure that all necessary components of the APA are evaluated.

The APA procedures provide a systematic approach which involves application of modeling and monitoring methods to estimate emission rates and concentrations of air contaminants. The procedures are designed to be flexible, allowing professional judgment to vary the performance of the APA. The checklists reflect the flexibility of the procedures while providing a systematic format of review. The checklists are not intended to prescribe the content and format of the APAs. They are designed to be applied to many different styles of Air Pathway Analyses. It should be possible to apply the checklist to all Superfund projects, although some projects will not require application of all the sections of the checklists.

With a few exceptions, the checklists do not provide reference data because the volume of data required would be too great. Reference data may be found in the NTGS volumes, in Applicable or Relevant and Appropriate Requirements (ARARs), and other engineering and scientific manuals.

It is expected that the checklists will be reviewed and revised as regulations and procedures vary and as experience in the use of the checklists becomes instructive.

The diversity in Superfund remedial activities require versatility in the procedures while at the same time the pathway of all known toxins must be evaluated as accurately as is possible. The nature of the air pathway analyses which must be reviewed by the EPA therefore vary significantly from one project to another. Therefore a concise but versatile review guidance is required to help the reviewer determine whether all necessary factors are evaluated. This guidance is provided as a set of questions contained in the checklists which the reviewer can apply to the submitted Superfund documents.

The EPA has developed a checklist for the review of PSD applications. The PSD checklist asks specific questions regarding measurements of air quality parameters. The four Superfund APA checklists differ from the PSD checklist in that they are more general in nature. This generality is necessary because these checklists must deal with the high variability in Superfund projects and criteria and non-criteria pollutants while the PSD checklist deal with criteria pollutants.

SECTION 4

CONTENT AND FORMAT OF THE CHECKLISTS

The four checklists developed for the review of Superfund documents are directed towards the deliverable documented results of Superfund projects. The individual checklists contain an identification section, an instruction section, some brief information, and sectionalized sets of questions related to specific portions or the required Superfund process. The four separate checklists are titled as follows:

- Review Criteria Checklist for the Workplan of the Superfund Remediation Process (WP Checklist);
- Review Criteria Checklist for the Remedial Investigation Phase of the Superfund Remediation Process (RI Checklist);
- Review Criteria Checklist for the Feasibility Study Phase of the Superfund Remediation Process (FS Checklist); and
- Review Criteria Checklist for the Remedial Design Phase of the Superfund Remediation Process (RD Checklist).

The WP checklist prompts the air reviewer to ensure that all the necessary aspects of the remedial investigation and the feasibility study are contained in the workplan. Questions concerning existing data on site conditions, preliminary site measurements, safety, planned analyses, and scheduling are included in the checklist.

The RI Checklist presents questions which prompt the reviewer to evaluate the completeness of the data presented to characterize the baseline conditions of the site. Sections on the physical characteristics of the site, the

characterization of the contamination, emission estimates, dispersion estimates, and ambient monitoring results, and exposure assessments are included.

The FS checklist includes questions on the physical site characteristics, site characterization, data quality, and a table for evaluation of each remedial alternative in respect to the above questions as well as ARARs, emission controls, waste disposal, emission monitoring, long-term effectiveness, storage and handling, and overall protection of the environment.

The RD Checklist contains questions on physical site characteristics, contaminant characterization, emissions, modeling, monitoring, and a table for results of questions on particular aspects of the APA for each contaminant being remediated. An additional table providing sources of potential ARARs is provided as a resource.

REFERENCES

1. U.S. Environmental Protection Agency. Volume I - National Technical Guidance Series - Application of Air Pathway Analyses for Superfund Activities. EPA-450/1-89-001, NTIS PB90 113374/AS.

2. U.S. Environmental Protection Agency. Volume II - National Technical Guidance Series - Estimation of Baseline Air Emissions at Superfund Sites. EPA-450/1-89-002, NTIS PB89 180053/AS.

3. U.S. Environmental Protection Agency. Volume III - National Technical Guidance Series - Estimation of Air Emissions From Clean-up Activities at Superfund Sites. EPA-450/1-89-003, NTIS PB89 180061/AS.

4. U.S. Environmental Protection Agency. Volume IV - National Technical Guidance Series - Procedures for Dispersion Modeling and Air Monitoring for Superfund Air Pathway Analyses. EPA-450/1-89-004, NTIS PB90 113382/AS.

5. U.S. Environmental Protection Agency. PSD Permit Applications Review Checklist. Internal Publication.

6. U.S. Environmental Protection Agency. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. EPA/540/G-89/004. Washington, D.C., October 1988.

7. U.S. Environmental Protection Agency. Guidelines on Air Quality Models (Revised). EPA-405/2-78-027R. NTIS PB86 245248. Office of Air Quality Planning and Standards. July 1986.

APPENDIX A

REVIEW CRITERIA CHECKLIST FOR THE WORKPLAN PHASE OF THE SUPERFUND REMEDIATION PROCESS (WP CHECKLIST)

REVIEW CRITERIA CHECKLIST FOR THE WORKPLAN OF THE SUPERFUND REMEDIATION PROCESS

(WP CHECKLIST)

SITE IDENTIFICATION

Site Name:_____ Account No.:_____
Operable Unit:_____ County/State:_____
Project Manager:_____ Branch:_____ Phone:_____
Air Reviewer:_____ Branch:_____ Phone:_____
Date Document Received:_____ Date Review Completed:_____

INSTRUCTIONS TO THE REVIEWER: This checklist is formatted along the lines of the Air Pathway Analysis process. Each work plan section contains a number of questions indicating what air-related information to look for. Each question should be marked according to the quality of the information presented in the work plan submission. We recommend a scale of one to four for the quality rank (1 - Very Thorough, 2 - Acceptable, 3 - Needs Revision, 4 - Missing). The deficiencies may then be compiled and summarized by the reviewer in a format of his/her choice. Tables 1 and 2 are attached to assist the reviewer in checking off requirements for multiple contaminants.

Section I relates to the presentation of the site conditions affecting the level of contamination and the air pathway.

Section II asks questions related to preliminary site measurements which may have been made in order to adequately characterize the contamination at the site for the purpose of scoping and planning. These preliminary measurements may or may not have actually been performed.

Section III contains questions on the characterization of the contamination with air pathway potential. Amounts, concentrations, risk analyses, and emission descriptions are examined. This section examines the quality of the information that the RPM is using as a basis for the RI.

Section IV includes questions which will help determine whether or not the planned measurements and analyses will provide sufficiently accurate and complete information to assess the risks to the environment due to the baseline site conditions and the remedial activities.

I. SITE DESCRIPTIONS

	R	N/A	Page #
1. Physical Setting Description:			
a. Contour and land use maps of waste area and surroundings?	___	___	_____
b. Schematic diagrams of facilities?	___	___	_____
c. Climatology: wind velocity rose, temperature means and extremes?	___	___	_____
d. Descriptions of major geographical features affecting dispersion?	___	___	_____

NOTES: _____

2. Are the distance and direction from the emission hazards to the susceptible receptors clearly identified? (See #3 below for examples of susceptible receptors) ___ ___ _____

NOTES: _____

3. Air contaminant receptor descriptions for the following?

a. Population centers, sensitive receptors such as schools, hospitals	___	___	_____
b. Farming, food train entries, transportation routes	___	___	_____
c. Flora, fauna, endangered species?	___	___	_____

NOTES: _____

4. Are previous biological testing results discussed as related to acute and chronic toxicity or bioaccumulation in the food chain? ___ ___ _____

NOTES: _____

5. History of site use: Disposal, closure, cleanup, other activities:

a. What was disposed during which time periods?	___	___	_____
b. Previous cleanup attempts?	___	___	_____
c. Is the time and method of site closure described?	___	___	_____
d. Other previous activities at the site described?	___	___	_____

NOTES: _____

6. Previous Air Quality enforcement actions or complaints?

NOTES: _____

II. SITE ANALYSES PRIOR TO THE REMEDIAL INVESTIGATION

	R	N/A	Page #

1. List the contaminants known to be present at the site prior to the preliminary site analyses:_____

_____

_____

_____

a. Are concentrations and quantity known for pollutants in liquid or solid phases with related potential to emit air pollutants?	___	___	_____
b. Are data classified according to physical and chemical characteristics (e.g., volatiles, semi-volatiles, metals, particulates)?	___	___	_____

NOTES:_____

_____

_____

2. Are site specific and regional atmospheric data related to air pathways listed?	___	___	_____

NOTES:_____

_____

_____

3. Existing air quality data summary:

a. Results of any previous sampling events: Air quality data related to the identified potential air contaminants?	___	___	_____
b. Is evidence of air contamination impacts documented?			
c. Is information on the data precision and accuracy included?	___	___	_____

NOTES:_____

_____

_____

4. Interim work plan:

a. Was an interim Health and Safety Plan (HSP) submitted?	___	___	_____
b. Are potential air contaminants addressed in HSP?	___	___	_____
c. Were measurements of potentially hazardous air contaminants taken and used as input to the HSP?	___	___	_____
d. Were data quality objectives defined for the interim work plan?	___	___	_____
e. Is a detailed description of the preliminary site analyses provided?	___	___	_____

f. List the contaminants and concentrations which were measured in the preliminary site work:_____

_____

_____

NOTES:_____

_____

_____

	R	N/A	Page #
5. Are reasons included for the decisions on whether to make additional site measurements for each of the following?			
a. Air Monitoring	___	___	_____
b. Site mapping	___	___	_____
c. Limited sampling to determine the need for waste treatability studies	___	___	_____
d. Preliminary ecological reconnaissance?	___	___	_____

NOTES: _____

III. CONTAMINANT IDENTIFICATION AND CHARACTERIZATION

	R	N/A	Page #
1. Waste characteristics:			
a. Distribution and volumes of types of waste described?	___	___	_____
b. Contaminants in the waste identified and characterized?	___	___	_____

NOTES: _____

_____

_____

2. Is a schematic model showing potential routes of exposure provided?			
a. Primary, Secondary air releases shown?	___	___	_____
b. Known and potential air emission sources shown?	___	___	_____
c. Known and potential air pathways shown?	___	___	_____
d. Known and potential receptors shown?	___	___	_____

NOTES: _____

_____

_____

3. a. Was a preliminary air contaminant hazard ranking performed?	___	___	_____
b. Results of hazard ranking summarized?	___	___	_____

NOTES: _____

_____

_____

4. Was a preliminary assessment of human health and environmental impacts (a risk assessment for each pollutant identified) performed?	___	___	_____

NOTES: _____

_____

_____

IV. PLANNED ANALYSES DURING REMEDIAL INVESTIGATION

	R	N/A	Page #
1. Preliminary identification (list) of air ARARs and TBC			
a. For potential emission sources resulting from possible remedial actions?	___	___	_____
b. For existing sources and contaminants?	___	___	_____

NOTES: _____

2. If a preliminary air pathway assessment is required for planning purposes, does it include the following?

a. Remedial action objectives listed?	___	___	_____
b. Identification of potential remedial alternatives?	___	___	_____
c. Potential technologies identified?	___	___	_____
d. Literature sources documenting technology effectiveness?	___	___	_____

NOTES: _____

3. Is the level of sophistication given for each of the parameters to be measured?

a. Ambient air quality measurements	___	___	_____
b. Emission measurements	___	___	_____
c. Meteorological measurements	___	___	_____
d. Emission estimates	___	___	_____
e. Dispersion model estimates	___	___	_____

NOTES: _____

4. Has the work plan indicated whether modeling or monitoring methods will be used to estimate the air quality impact for each contaminant? ___ ___ _____

NOTES: _____

5. Is the approach supported with a justification? ___ ___ _____

NOTES: _____

6. Does the reviewer feel that the appropriate analysis methods are planned (Table 21, Volume IV, APA procedures)? ___ ___ _____

NOTES: _____

	R	N/A	Page #
7. Will the APA schedule and approach provide adequate measurement data and still meet the project schedule?	___	___	_____

NOTES: _____

8. Are the planned duration and frequency of monitoring sufficient (Table 20, Volume IV, APA procedures)? ___ ___ _____

NOTES: _____

9. Have the data uses been identified and prioritized? ___ ___ _____

NOTES: _____

10. Are the DQOs or level of sophistication appropriate to the data uses? ___ ___ _____

NOTES: _____

11. Will the testing plan fill the data gaps identified during the initial evaluation? ___ ___ _____

NOTES: _____

12. Are the qualifications and training of the monitoring, modeling, and QA/QC staff described and adequate? ___ ___ _____

NOTES: _____

13. Do the planned emission measurements meet State regulations? ___ ___ _____

NOTES: _____

14. Do the planned screening approaches meet the guidelines as shown in Table 6 of Volume IV, APA procedures? ___ ___ _____

NOTES: _____

	R	N/A	Page #
15. Does the dispersion modeling plan follow the guidelines in Table 8, Volume IV, APA procedures?	___	___	_____

NOTES:_____

_____

_____

16. Is the planned meteorological database sufficient for modeling and monitoring APA activities?	___	___	_____

NOTES:_____

_____

_____

TABLE 1. TABLE OF CONTAMINANT IDENTIFICATION AND CHARACTERIZATION

Contaminant Name (or Formula)	List of Contaminants Identified or Expected														
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
Information Required															
Concentration data meet DQOs?															
QA/QC sufficient?															
Media Described?															
Hazard index known?															
Amount of contaminant defined?															
QA/QC sufficient?															
Media Described?															
Hazard index known?															
Emission points defined?															
Volumetric rates for point sources?															
Dimensions of sources defined?															
Concentration at source?															
Mass emission rates: average long-term															
Mass emission rates: short-term															
Density relative to air?															
Particle size distribution?															

TABLE 2. PLANNED AMBIENT MONITORING AND MODELING

Analysis	Contaminant List														
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
Monitoring	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Screening Duration	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Refined: Duration	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Frequency	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Modeling: Screening Method	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Refined Method	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

APPENDIX B

REVIEW CRITERIA CHECKLIST FOR THE REMEDIAL INVESTIGATION PHASE OF THE SUPERFUND REMEDIATION PROCESS (RI CHECKLIST)

REVIEW CRITERIA CHECKLIST FOR THE REMEDIAL INVESTIGATION
PHASE OF THE SUPERFUND REMEDIATION PROCESS

(RI CHECKLIST)

SITE IDENTIFICATION

Site Name:_____ _____Account No.:_____
Operable Unit:_____ _____County/State:_____
Project Manager:_____Branch:_____Phone:_____
Air Reviewer:_____Branch:_____Phone:_____
Date Document Received:_____Date Review Completed:_____

INSTRUCTIONS TO THE REVIEWER: This checklist is formatted along the lines of the Air Pathway Analysis process. Each work plan section contains a number of questions indicating what air-related information to look for. Each question should be marked according to the quality of the information presented in the work plan submission. We recommend a scale of one to four for the quality rank (1 = Very Thorough, 2 = Acceptable, 3 = Needs Revision, 4 = Missing). The deficiencies may then be compiled and summarized by the reviewer in a format of his/her choice.

Tables 1, 2, and 3 are provided to aid the reviewer in tracking the performance of the RI for each contaminant. If the potential air contaminant is identified in the work plan it should be tracked in the RI report through the stages of the APA. The reviewer may want to assign an identification number to each contaminant of interest and use the same identification in each table. The reviewer may enter a 'Y' on 'N' in appropriate cells to indicate sufficiency of the submission, or she/he may choose to enter values for easy access later in the review process.

Part A contains the baseline risk assessment review under the following sections:

I PHYSICAL CHARACTERISTICS OF THE SITE
II NATURE AND EXTENT OF CONTAMINATION
III EMISSION ESTIMATES
IV ATMOSPHERIC DISPERSION ESTIMATES
V AMBIENT AIR MONITORING RESULTS
VI EXPOSURE ASSESSMENT

Part B contains a question on the estimates of disturbed site emissions.

PART A BASELINE RISK ASSESSMENT

SECTION I - REMEDIAL INVESTIGATION: Physical Characteristics of the Site

	R	N/A	Page #
1. Are topographic features and water bodies at the site and vicinity discussed and graphically displayed?	___	___	_____

NOTES: _____

_____

2. Are the soil and vegetation characteristics of the site and vicinity described?	___	___	_____

NOTES: _____

_____

3. Are the distance and direction from the emission hazards to the susceptible receptors clearly identified?	___	___	_____

NOTES: _____

_____

4. Does the site investigation provide survey data on the human population (especially off-site) that may have been exposed to contaminated air from the site?	___	___	_____

NOTES: _____

_____

5. Does the site investigation include information on:

a. Possible health effects?	___	___	_____
b. Health complaints?	___	___	_____

NOTES: _____

_____

SECTION II - REMEDIAL INVESTIGATION: Nature and Extent of Contamination

	R	N/A	Page #
1. [Note: Question 1 is of critical importance.] Have the level and extent of contamination of surface-water, sediment, soil, and ground-water been determined?	___	___	_____
Has the uncertainty of estimates been sufficiently defined?	___	___	_____

NOTES: _____

_____

2. Does the analysis sufficiently characterize volatiles or hazardous inorganics with air release potential? A contaminant characterization matrix is attached which will aid the reviewer in checking that all required data on each contaminant is addressed.	___	___	_____

NOTES: _____

_____

3. Has the source of the waste been identified? (Sources may include petroleum refining, pesticide production, petrochemical or chemical manufacturing, etc.)	___	___	_____

NOTES: _____

_____

SECTION III - REMEDIAL INVESTIGATION: Baseline Emission Estimates

	R	N/A	Page #
1. Were screening level emission source sampling studies performed?	___	___	_____

NOTES:_____

_____

2. Are results from screening level studies presented?	___	___	_____

NOTES:_____

_____

3. Were all units of a combined site studied?	___	___	_____

NOTES:_____

_____

4. Was a QA/QC program to assess data quality sufficient?	___	___	_____

NOTES:_____

_____

5. Was it determined that the screening study was adequate to characterize the air contamination migration pathway?	___	___	_____

NOTES:_____

_____

6. If a detailed baseline emissions estimate was then deemed necessary, were in-depth survey technologies then implemented?	___	___	_____

NOTES:_____

_____

7. If the screening study was deemed to sufficiently characterize the air pathway, does the reviewer concur (i.e., decision to terminate the APA due to lack of impact)?	___	___	_____

NOTES:_____

_____

	R	N/A	Page #
8. Does the emission model fully describe the waste characteristics:			
a. Volatiles - vapor pressure, Henry's Law constant, water solubility, temperature?	___	___	_____
b. Particulates - rainfall, wind speed, physical state of waste, porosity and density of soil, moisture content of soil?	___	___	_____

NOTES: _____

_____

9. How were the indicator chemicals selected (also called "target compounds")? Did the contractor follow the methodology for selecting these compounds for assessing human health risks as described in the "Superfund Public Health Evaluation Manual" (U.S.EPA, Oct. 1986)? ___ ___ _____

NOTES: _____

_____

10. Does the report relate the selection of indicator species to the ideal indicator as described in Volume II, NTGS APA manual (p. 36)? ___ ___ _____

NOTES: _____

_____

11. After selection of the indicator chemicals, is there discussion of a final check to be made during remedy selection to ensure that the proposed strategy will address risks posed by the full range of contaminants at the site? ___ ___ _____

NOTES: _____

_____

12. Do the emissions rates correlate with information available on the types of waste contained at the site (i.e., presence of waste solvents resulting in volatile emissions, presence of asbestos waste resulting in particulate emissions)? ___ ___ _____

NOTES: _____

_____

	R	N/A	Page #

Potential Routes of Migration

13. Did the report consider all soil/waste characteristics which would affect migration (i.e., adsorption or absorption properties of the soil, solubility in water, microbial action of soil, moisture content of soil)? ___ ___ _____

NOTES:_____

14. Were other site characteristics included (i.e., temperature, pressure, wind speed, presence of berms or wind breaks, and waste geometry)? ___ ___ _____

NOTES:_____

15. Based on meteorological data above and waste location, could soil particulates (i.e., entrained dust) be a potential source of emissions? ___ ___ _____

NOTES:_____

16. Was soil sampling extensive enough to determine that potential "hot spots" are located? ___ ___ _____

NOTES:_____

Air Emissions from Surface Wastes

17. Are all potential forms of air emissions from surface wastes considered:

    a. Gas phase mechanisms include: volatilization, biodegradation, photodecomposition, hydrolysis, and combustion. ___ ___ _____
    b. Particulate mechanisms include: wind erosion, mechanical disturbance, combustion, and absorption. ___ ___ _____

NOTES:_____

	R	N/A	Page #
18. Did the report include air emissions from gas migration controls (if present)?	___	___	_____

NOTES:_____

_____

19. Did the report include air emissions from volatilization of dissolved contaminants from contaminated ground water?	___	___	_____

NOTES:_____

_____

Air Emissions from Subsurface Wastes

20. Are all potential forms of air emissions from subsurface wastes considered (includes emissions at the surface soil/atmosphere interface caused by contaminated soil gas)?	___	___	_____

NOTES:_____

_____

21. Were emissions (predictive) models used to compare or validate other emissions estimates?	___	___	_____

NOTES:_____

_____

22. Were QA/QC checks performed to evaluate the model?	___	___	_____

NOTES:_____

_____

23. Is the emissions model appropriate for the source (i.e., has the model been validated)?
Validated models for various emission sources include:

a. AP-42 Dust Emission from Vehicles	___	___	_____
b. Covered Landfill Models	___	___	_____
c. Open Dump Models	___	___	_____
d. Lagoon Models	___	___	_____

NOTES:_____

_____

	R	N/A	Page #
24. If source models were used, is the following information given?			
a. Are the models referenced?	___	___	_____
b. Are accuracy and limitations discussed?	___	___	_____
c. Is the version or date given?	___	___	_____

NOTES: _____

_____

SECTION IV - REMEDIAL INVESTIGATION: Atmospheric Dispersion Estimates - If modeling is required, the following questions apply:

	R	N/A	Page #
1. Are model inputs documented in a form similar to Table 3, Volume IV, of the APA procedures?	___	___	_____

NOTES:_____

_____

2. Is the emission inventory defined according to guidelines (Section 2.4.4, Volume IV, APA procedures)?	___	___	_____

NOTES:_____

_____

3. Are the screening technique used appropriate (list of techniques and applications shown in Table 6, Volume IV, APA procedures?	___	___	_____

NOTES:_____

_____

4. Are the refined techniques used listed in Table 7, Volume IV, APA procedures?	___	___	_____

NOTES:_____

_____

5. Is the receptor grid adequately designed to include sufficient detail for all receptors, with higher resolution for sensitive receptors?	___	___	_____

NOTES:_____

_____

6. If any other modeling technique (other than those listed in volume IV) is used, is an adequate justification provided?	___	___	_____

NOTES:_____

_____

7. Does the meteorological data set meet program DQOs (Table 5, Volume IV)?	___	___	_____

NOTES:_____

_____

	R	N/A	Page #
8. If off-site meteorological data are used, are the data representative of the site?	___	___	_____

NOTES:_____

_____

9. Is the length of the meteorological data set sufficient?	___	___	_____

NOTES:_____

_____

10. Was a benchmark test case run on the model?	___	___	_____

NOTES:_____

_____

11. Were all the model switch settings appropriate?	___	___	_____

NOTES:_____

_____

12. Was the model uncertainty addressed in the analysis of results?	___	___	_____

NOTES:_____

_____

13. Was a supplemental analysis performed if necessary?	___	___	_____

NOTES:_____

_____

14. Is the modeling report complete (the recommended outline is found on page 2-76 of Volume IV, APA procedure)?	___	___	_____

NOTES:_____

_____

SECTION V - REMEDIAL INVESTIGATION: Ambient Air Monitoring Results

	R	N/A	Page #
1. Were the indicator chemicals (also called "target compounds") selected according to the guidelines (Section 3.4.2, Volume IV, APA procedures)?	___	___	_____

NOTES:_____

_____

2. Was the choice of screening methods appropriate?	___	___	_____

NOTES:_____

_____

3. Does the reviewer agree with the conclusions drawn from the screening studies? The attached Air Monitoring Results table can be of assistance in tracking and evaluating the completeness and quality of the screening studies for each contaminant of concern. The results can be related to the application of the sampling techniques as summarized in Table 14, Volume IV, APA procedures.	___	___	_____

NOTES:_____

_____

4. Was the Quality Assurance/ Quality Control sufficient (Tables 35 & 36, Volume IV, APA procedure)?	___	___	_____

NOTES:_____

_____

5. Are Monitoring result Summaries sufficient (use attached Table 2)?	___	___	_____

NOTES:_____

_____

Meteorological Investigations (Guidelines are found in Section 3.4.3, Volume IV, APA procedures)

6. Does the meteorological program meet the requirements of the APA procedures for the following categories?			
a. Screening studies	___	___	_____
b. Refined studies	___	___	_____
c. Data quality objectives (Tables 16 & 17 Volume IV)	___	___	_____
d. Monitor network design survey (if applicable)	___	___	_____

NOTES:_____

_____

SECTION VI - REMEDIAL INVESTIGATION: Exposure Assessment

An EXPOSURE ASSESSMENT table which relates each air contaminant identified to the requirements below is attached to assist the reviewer in tracking performance of the APA.

	R	N/A	Page #
1. Are all existing human receptors identified (including sensitive subpopulations such as pregnant women and infants)?	___	___	_____

NOTES:_____

_____

2. Are both acute and chronic exposure addressed?	___	___	_____

NOTES:_____

_____

3. Does the site investigation adequately assess plant and animal life that may have been exposed to identified air contaminants from the site?	___	___	_____

NOTES:_____

_____

4. Were any sensitive environments identified (examples include wetlands, flood plains, wildlife breeding areas, wildlife refuges, and other specially designated areas such as parks and scenic areas)?	___	___	_____

NOTES:_____

_____

5. Were any endangered species and their habitats identified?	___	___	_____

NOTES:_____

_____

6. Is the surrounding area home to any species which are consumed by humans or found in human food chains?	___	___	_____

NOTES:_____

_____

7. Are future possible changes in receptors discussed (i.e., what are implications for long-term)?	___	___	_____

NOTES:_____

_____

	R	N/A	Page #
8. Have exposure estimates from modeling results and from monitoring studies been adequately applied to applicable state and federal ARARS?	___	___	_____

NOTES: _____

_____

9. Have modeling and monitoring results been compared and the differences discussed?	___	___	_____

NOTES: _____

_____

10. Is the level of contamination of plant and animal life known? (Potential impact on food chain?)	___	___	_____

NOTES: _____

_____

PART B ASSESSMENT OF DISTURBED SITE CONDITION

I. If any preliminary removal action is performed or planned, does the report include any estimates of air emission rates from the source in its disturbed state resulting from possible remediation activities such as the following?

	R	N/A	Page #
1. Excavation (e.g., possibility of breaching buried tanks or drums, or additional exposure of volatile waste when removing overburden)	___	___	_____

NOTES: _____

_____

2. Transport (e.g., additional particulates caused by increased vehicular traffic)	___	___	_____

NOTES: _____

_____

3. Dumping	___	___	_____

NOTES: _____

_____

4. Storage	___	___	_____

NOTES: _____

_____

3. Grading	___	___	_____

NOTES: _____

_____

TABLE 1. CONTAMINANT CHARACTERIZATION MATRIX

Parameter	Contaminant #1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
1. Volume															
2. Physical Dimensions															
3. Concentration															
4. Media															
5. Media Properties															
6. Exposure															
7. Containment															
8. Physical Location															
9. Volatility															
10. Biodegradability															
11. Particle Size Distribution															
12. Wind Erodibility															

TABLE 2. AMBIENT AIR MONITORING RESULTS

Parameter	Contaminant #1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
1. Level of Sophistication	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2. Existing Data	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3. Detection Limits	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4. Upwind Concentrations	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5. Sample Periods Reported	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6. Number of Samples	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7. Mean Concentrations	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8. Minimum Concentrations	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9. Maximum Concentrations	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10. Number of Excursions	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
ARARS	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
H & S Criteria	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Odor Thresholds	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
11. Data Recovery Rates	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
12. Plots of Results	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

TABLE 3. EXPOSURE ASSESSMENT

Exposure Data	Contaminant #1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14	#15
1. Acute Exposure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2. Chronic Exposure	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
3. Gas Phase	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
4. Particulate	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5. Aerosol	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6. Continuous	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7. Intermittent	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8. Variability	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9. Locations	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10. Exceeds ARARS?	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

APPENDIX C

REVIEW CRITERIA CHECKLIST FOR THE FEASIBILITY STUDY PHASE OF THE SUPERFUND REMEDIATION PROCESS (FS CHECKLIST)

REVIEW CRITERIA CHECKLIST FOR THE FEASIBILITY STUDY
PHASE OF THE SUPERFUND REMEDIATION PROCESS

(FS CHECKLIST)

SITE IDENTIFICATION

Site Name:_____ Account No.:_____
Operable Unit:_____ County/State:_____
Project Manager:_____ Branch:_____Phone:_____
Air Reviewer:_____ Branch:_____Phone:_____
Date Document Received:_____ Date Review Completed:_____

INSTRUCTIONS TO THE REVIEWER: Each question should be marked according to the quality of the information presented in the Feasibility Study submission. We recommend a scale of one to four for the quality rank (1-Very Thorough, 2-Acceptable, 3-Needs Revision, 4-Missing, with N/A-Not Applicable). A space is provided for the page number in the document where the relevant information is found. The deficiencies may then be compiled and summarized by the reviewer in a format of his/her choice.

Section IV of this checklist is the detailed evaluation of alternatives. TABLE 1 should be completed for this portion.

I. PHYSICAL SITE CHARACTERISTICS

The features of the site and vicinity should be described in sufficient detail to enable a thorough Air Pathway Analysis for each of the remedial alternatives evaluated. The reviewer should ensure that the following features are described:

	N/A	Page #	R
1. Contour and land use maps of waste area and surroundings.	___	_____	___
2. Schematic diagrams of facilities.	___	_____	___
3. Distance and direction to susceptible receptors (eg. population centers, especially schools, hospitals, and farms, transportation routes, endangered species) from potential emission sources.	___	_____	___
4. Meteorological and climatological factors.	___	_____	___

Comments:_____
_____
_____

II. SITE CHARACTERIZATION

The nature and extent of the contamination at the site should be defined in sufficient detail for calculation of the rates and duration of remedial operations for each of the alternatives evaluated. Table I of the RI Checklist may be of assistance in evaluating the submission in more detail. Following are the key items:

	N/A	Page #	R
1. Distribution, volumes, and concentrations of contaminants.	___	_____	___
2. Physical, chemical, and toxic properties of contaminants.	___	_____	___
3. Media descriptions and properties.	___	_____	___
4. Physical location and containment.	___	_____	___

Comments:_____
_____
_____

III. DATA QUALITY

The confidence of estimates should be maximized by the use of the highest quality data available. The following guidelines apply:

	N/A	Page #	R
1. Are site-specific measurements used whenever possible?	___	_____	___
2. If models are used, are site-specific measurements used for inputs whenever available?	___	_____	___
3. Are tabulated default values (used only when measured data are not available) supported by literature?	___	_____	___
4. Is the data quality sufficient for the feasibility study?	___	_____	___

Comments:_____
_____
_____

IV. EVALUATION OF ALTERNATIVES

Table I should be completed to examine in detail the individual remedial action alternatives evaluated.

REVISIONS OR ADDENDUMS REQUIRED

Any recommended revisions or requests for more information resulting from the review should be listed along with the reasons for their requirement. The contaminants involved should be specified. The following table is provided for listing the requirements:

Requirement	Reasons	Contaminants
1:		
2:		
3:		
4:		
5:		
6:		

TABLE 1. REMEDIAL ACTION ALTERNATIVE EVALUATION

Criteria	Alternative Descriptions #1	#2	#3	#4	#5	#6	#7	#8	#9	#10
1. Site characterization sufficient?										
2. Alternative description sufficient?										
3. Alternative causes air impacts?										
4. ARARs identified?										
5. Use of highest quality data available?										
6. Are all the potential air contaminants identified in the RI evaluated?										
7. Appropriate emission control methods evaluated?										
8. New products resulting from remedial action evaluated?										
9. Ash or waste disposal addressed?										
10. Emissions during storage and handling assessed?										
11. Short-term and long-term effects evaluated?										
12. Worst-case conditions evaluated?										
13. Methods of monitoring emissions?										
14. Overall protection of health and environment?										
15. Long-term effectiveness and permanence of alternative evaluated?										
Revised evaluation required?										
Contaminants not sufficiently evaluated: 1.										
2.										
3.										
4.										
5.										

APPENDIX D

REVIEW CRITERIA CHECKLIST FOR THE REMEDIAL DESIGN PHASE OF THE SUPERFUND REMEDIATION PROCESS (RD CHECKLIST)

REVIEW CRITERIA CHECKLIST FOR THE REMEDIAL DESIGN PHASE
OF THE SUPERFUND REMEDIATION PROCES

(RD CHECKLIST)

SITE IDENTIFICATION

Site Name:_____Account No.:_____
Operable Unit:_____County/State:_____
Project Manager:_____Branch:_____Phone:_____
Air Reviewer:_____Branch:_____Phone:_____
Date Document Received:_____Date Review Completed:_____

INSTRUCTIONS TO THE REVIEWER: The controls required to protect health and environment should be determined and any deficiencies in the RD should be identified. The extent of the modeling and monitoring (process and ambient) must be evaluated to determine the adequacy of environmental protection defined in the RD. We recommend a scale of one to four for the quality rank (1= Very Thorough, 2= Acceptable, 3= Needs Revision, 4= Missing). A space is provided for the page number in the document where the relevant information is found and N/A=Not Applicable. The deficiencies may then be compiled and summarized by the reviewer in a format of his/her choice.

A table is provided to track the completeness of the remedial design APA (Table 1).

A table of sources of potential Superfund ARARS is attached (Table 2).

The checklist contains the following sections.

I. Physical Site Characteristics

II. Characterization of Contamination

III. Emissions

IV. General

V. Modeling

VI. Monitoring

VII. Revisions or Addendums Required

I. PHYSICAL SITE CHARACTERISTICS

The features of the site and vicinity should be described in sufficient detail to enable a thorough Air Pathway Analysis (evaluation of modeling, monitoring, and risk assessment if necessary) for the remedial design. The features which should be described are:

		N/A	Page#	R
1.	Contour and land use maps of waste area and surroundings?	___	_____	___
2.	Schematic diagrams of facilities and other data relevant to emissions (location, height, temperature, velocity of emissions, and structural measurements?	___	_____	___
3.	Distance and direction to susceptible receptors (as determined from modeling results) (eg. nearest residences and population centers, especially schools, hospitals, retirement homes, and farms, transportation routes, endangered species) from potential emission sources?	___	_____	___
4.	Meteorological and climatological factors. (Seasonal wind roses, precipitation temperature, and description of severe weather and topographic effects.)	___	_____	___

Comments:_____

_____

_____

II. CHARACTERIZATION OF CONTAMINATION:
The nature and extent of the contamination at the site should be defined in sufficient detail for calculation of the rates and duration of remedial operations. The physical and chemical characteristics of the waste and the contaminated media should also be described and grouped to ensure proper assessment techniques are applied. The descriptions should be directly related to the risks that the contamination poses to exposure via the air pathway.

		N/A	Page#	R
1.	Are the physical characteristics of the contaminated media described (e.g., soil & geology, surface water, size and distribution of contaminated or potentially contaminated media, possible routes of migration to the atmosphere)?	___	_____	___
2.	Are the contaminants described in sufficient detail to determine the best method of measurement and estimation (e.g., separation of contaminants into volatile, semi-volatile, liquid and particulate groups)?	___	_____	___
3.	Is the description consistent with site history?	___	_____	___
4.	Are other contaminants expected even though they have not yet been identified?	___	_____	___
5.	Are contaminants prioritized according to relative risk potential?	___	_____	___

Comments:_____
_____
_____

III. EMISSIONS	N/A	Page#	R
1. Are all the potential remedial action emission sources (routine and fugitive) assessed (removal, treatment, incineration, containment)?	___	_____	___
2. Are all uncontrolled sources defined and quantified sufficiently?	___	_____	___
3. Are the control methods and control efficiencies defined?	___	_____	___
4. Engineering Design Criteria:			
• Are air emission-related parameters sufficiently defined for each control technology (maximum and average design emission rates, stack dimensions, exit velocity, design load, operating conditions)?	___	_____	___
• Has sufficient information been included to check the quality of the designs (P&ID, PFD, operational descriptions)?	___	_____	___
• Will sufficient operational monitoring data be collected?	___	_____	___
• Are acceptance testing and trial runs with sufficient testing planned?	___	_____	___

Comments:_____

_____

_____

IV. GENERAL	N/A	Page#	R
1. Have all the air related local, state, and federal ARARS (emission and ambient) been researched and addressed? The attached table will assist in checking the ARARS for each contaminant. Comments:_____	___	_____	___
2. Are risk assessments conducted if no ARARS or TBC's exist for a particular contaminant. Comments:_____	___	_____	___
3. Based on the site characterizations, and risk assessments, does the reviewer agree with the LIST OF CONTAMINANTS for which APA is required? Comments:_____	___	_____	___
4. Are the DATA QUALITY OBJECTIVES defined and based on data usage? Comments:_____	___	_____	___
5. Is the APA INPUT DATA quality maximized (site specific data whenever available, if not, modeled data using site specific inputs, or, last, tabulated defaults)? Comments:_____	___	_____	___
6. Is the SCHEDULE of activities sufficient for information feedback from air contaminant laboratory analysis and modeling activities, etc (e.g., laboratory analysis results may take one month)? Comments:_____	___	_____	___

		N/A	Page#	R
7.	Are BASELINE emission estimates included in the emission inventory?	___	_____	___
	Comments:_____			
	_____			
	_____			
	_____			
8.	Does the choice of TARGET COMPOUNDS (indicator chemicals) follow the NTG (VOL II)?	___	_____	___
	Comments:_____			
	_____			
	_____			
	_____			

V.	MODELING	N/A	Page#	R
1.	Do the SCREENING MODEL techniques follow the Superfund APA procedures? Comments:_____	___	_____	___
2.	Are the estimated BACKGROUND CONCENTRATIONS appropriate? Comments:_____	___	_____	___
3.	Are WORST-CASE scenarios assessed using appropriate worst-case meteorological conditions? Comments:_____	___	_____	___
4.	Does the METEOROLOGICAL data quality meet the EPA requirements? Comments:_____	___	_____	___
5.	Are the RECEPTOR GRID selections consistent with Superfund APA procedures? Comments:_____	___	_____	___
6.	Does the refined modeling include BENCHMARK tests? Comments:_____	___	_____	___
7.	Are the modeling UNCERTAINTIES defined and the APA implications discussed? Comments:_____	___	_____	___

RD CHECKLIST (Continued)

	N/A	Page#	R
8. Are TOPOGRAPHIC, WATER BODY, and BUILDING features addressed in models?	___	____	___
Comments:_____			
9. Are FUGITIVE emissions modeled (including fugitive dusts from remedial activities)?	___	____	___
Comments:_____			
10. Are the SOURCE types and dimensions correct defined?	___	____	___
Comments:_____			
11. Are the emission control effects on source parameters included in the modeling input?	___	____	___
Comments:_____			
12. If the ISC model is not used, is the model choice appropriate?	___	____	___
Comments:_____			

VI. MONITORING	N/A	Page#	R
1. Is the QAPP sufficient?	___	___	___
Comments:_____			
2. Is the ambient MONITORING PLAN based on the following considerations?	___	___	___
Dispersion model predictions	___	___	___
Environmental characteristics	___	___	___
Receptor characteristics	___	___	___
Source characteristics	___	___	___
Siting constraints	___	___	___
Duration of program	___	___	___
Comments:_____			
3. Are MONITOR AND PROBE siting in compliance with EPA criteria ?	___	___	___
Comments:_____			
4. Are the following sufficiently defined in the monitoring plan?	___	___	___
Meteorological monitoring	___	___	___
Sampling schedule	___	___	___
Staffing	___	___	___
Instrumentation	___	___	___
Data quality	___	___	___
Comments:_____			
5. Has monitoring been correctly performed for Health & Safety Plan input?	___	___	___
Comments:_____			

VII. REVISIONS OR ADDENDUMS REQUIRED

Any recommended revisions or requests for more information study resulting from the review should be listed along with the reasons for their requirement. The contaminants involved should be specified. The following table is provided for listing the requirements:

	Requirement	Reasons	Contaminants
1:			
2:			
3:			
4:			
5:			
6:			

TABLE 1. REMEDIAL DESIGN CHECKLIST TABLE

Exposure Data	Contaminant #1	#2	#3	#4	#5	#6	#7	#8	#9	#10
1. ARARs Applicable?										
Alternate Screening Levels Defined?										
2. Emission Rates Defined?										
Maximum Design Rates for Short-Term Assessment										
Typical Long Term Average Rates										
3. Toxicity Factors										
4. Offsite Sources Identified										
5. Emission Monitoring Required										
6. Data Quality Objectives Defined?										
7. Screening Modeling Acceptable?										
8. Background Concentrations Estimated?										
9. Fugitive Emission Modeled?										
10. QAPP Sufficient?										
11. Source Parameters Defined?										
12. Exposure Pathways Other Than Inhalation Considered?										

TABLE 2. SOURCES OF POTENTIAL SUPERFUND ARARs

	Pre Remediation Sources				Remediation Sources					Post Remediation Sources			
	Landfills	Lagoons	Contaminated Soil	Containers (Above-ground)	Soil Handling	Air Strippers	Incinerators	In-Situ Venting	Solidification/ Stabilization	Landfills	Lagoons	Soil Surfaces	Container (above ground)
FEDERAL													
Clean Air Act													
NAAQS:													
PM-10	X		X		X		X					X	
SO_2							X						
CO							X						
O_3	X	X	X	X	X	X	X	X		X	X		X
NO_x							X						
Pb			X		X		X						
NESHAP:													
Asbestos	X		X	X	X					X		X	X
Benzene				X									X
NSPS:													
VOC													X
PSD:													
Ambient Impact							X						
BACT							X						
NA:													
Emission Off-sets							X						
LAER							X						
RCRA													
40 CFR 264	X		X		X				X	X		X	
3004d	X	X	X	X						X	X	X	X
3004n				X									X
3004o	X	X	X	X						X	X	X	X

(Continued)

Source: NTG Vol. I (EPA-450/1-89-001).

TABLE 2. (Continued)

	Pre-Remediation Sources				Remediation Sources					Post Remediation Sources			
	Landfills	Lagoons	Contaminated Soil	Containers (Above-ground)	Soil Handling	Air Strippers	Incinerators	In-Situ Venting	Solidification/ Stabilization	Landfills	Lagoons	Soil Surfaces	Container (above ground)
3004u	X	X	X	X						X	X	X	X
Subpart O							X						
OSHA	X	X	X	X	X	X	X	X	X	X	X	X	X
TSCA							X						
FIFRA	X	X	X	X	X		X		X	X	X	X	X
AEA	X	X	X	X	X				X	X	X	X	X
UMTRCA			X		X							X	
STATE													
Air Toxics Program:	X	X	X	X	X	X	X	X	X	X	X	X	X
SIP:	X	X	X	X	X	X	X	X	X	X	X	X	X
Odor/Fugitive Dust Nuisances:	X	X	X	X	X	X	X	X	X	X	X	X	X
H&R - Air Emissions:	X	X	X	X	X	X	X	X	X	X	X	X	X

Key:
PM-10 - Particulate matter less than 10 microns.
SO_2 - Sulfur dioxide
NA - Non-attainment
CO - Carbon monoxide
O_3 - Ozone
NO_2 - Nitrogen dioxide
VOC - Volatile Organic Compounds
TSCA - Toxic Substances Control Act
BACT - Best Available Control Technology
LAER - Lowest Achievable Emission Rate
NAAQS - National Ambient Air Quality Standards
NESHAP - National Emission Standards for Hazardous Air Pollutants
FIFRA - Federal Insecticide, Fungicide, and Rodenticide Act
NSPS - New Source Performance Standards
PSD - Prevention of Significant Deterioration
RCRA - Resource Conservation and Recovery Act
RCRA 40CFR264 - Fugitive Particulate Emissions
RCRA 3004^{d} - No Migration
RCRA 3004^{O} - Location Standards
RCRA 3004^{n} - Air Emissions Monitoring/Control
RCRA 3004^{u} - Corrective Action
RCRA Subpart O - Hazardous Waste Incinerators
AEA - Atomic Energy Act
SIP - Site Implementation Plan for Clean Air Act
OSHA - Occupational Safety and Health Act
UMTRCA - Uranium Mill Tailings Radiation Control Act

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16. ABSTRACT

The EPA has responsibility for assessment and cleanup of superfund sites. Because air emissions pose a potential human health risk at these sites, the EPA has developed a set of procedures for evaluating these risks. The four checklists presented in this report provide a systematic approach for air reviewers to apply the air pathway assessment procedures. The background, prupose, and application of the checklists are discussed.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pathway Assessment Air Pollution Superfund Exposure Assessment Air Pathway Analysis	Air Pollution Assessment	

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